WEST Search History

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DATE: Tuesday, August 16, 2005

Hide?	Set Name	Query	Hit Count
		DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ	
☐	L55	L53 and (((median or (middle or center$4 or central$2) adj (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4 or distribution)) with (slice or slab or plane))	1
☐	L54	L53 and (((median or (middle or center$4 or central$2) with (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4 or distribution)) with (slice or slab or plane))	4
☐	L53	L52 or l51 or l50	17379
☐	L52	382/128-131.ccls.	2435
☐	L51	600/407-435.ccls.	7923
☐	L50	324/300-322.ccls.	8435
☐	L49	(((magnetic adj resonance) or MRI or NMR) and (((median or (middle or center$4 or central$2) adj (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4 or distribution)) with (slice or slab or plane)))	1
☐	L48	L47 and ((magnetic adj resonance) or MRI or NMR)	1
☐	L47	(((median or (middle or center$4 or central$2) adj (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4 or distribution)) with (slice or slab or plane))	2
☐	L46	(((median or (middle or center$4 or central$2) with (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4 or distribution)) with (slice or slab or plane))	10
☐	L45	(((median or (middle or center$4 or central$2) with (value or number or amount or total)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4)) with (slice or slab or plane))	2
☐	L44	L43 and (((median or middle or center$4 or central$2) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4)) with (slice or slab or plane))	2
☐	L43	L39 and ((median or middle or center$4 or central$2) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	4
☐	L42	L39 and (median)	1

text
Classification Interference Search

☐	L41	L40 and (median)	1
☐	L40	L39 and ((percent$4 or amount$3 or number or total or ratio) with (pixel or voxel or ((picture or volume) with element)) with (slice or slab or plane))	2
☐	L39	L27 and ((magnetic adj resonance) or MRI or NMR)	23
☐	L38	L37 and ((percent$4 or amount$3 or number or total or ratio or threshold$3 or cutoff or "cut off" or cut-off) with (pixel or voxel or ((picture or volume) with element)) with (even or odd or positive or negative or plus or minus or polarity or "up" or "down" or "above" or "below"))	3
☐	L37	L31 and ((even or odd or positive or negative or plus or minus or polarity or "up" or "down" or "above" or "below") with (pixel or voxel or ((picture or volume) with element)))	3
☐	L36	L33 and ((median) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	1
☐	L35	L34 and ((median) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	1
☐	L34	L27 and (median)	18
☐	L33	L26 and (median)	131
☐	L32	L31 and (median)	1
☐	L31	L30 and ((median or middle or center$4 or central$2) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	4
☐	L30	L29 and (((median or middle or center$4 or central$2) with (pixel or value)) with ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	4
☐	L29	L28 and (even or odd or positive or negative or plus or minus or polarity or "up" or "down" or "above" or "below")	4
☐	L28	L27 and ((median or middle or center$4 or central$2) with (pixel or value or frequency or offset$4 or "off set$4" or off-set$4 or (pixel or voxel or ((picture or volume) with element)))) with (("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	4
☐	L27	L26 and (("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field))) with (map$4))	84
☐	L26	L25 and ("bo" or "b0" or "b.sub.o" or "b.sub.0" or ((static or main or uniform or constant or primary) with (magnetic or field)))	715
☐	L25	L24 and ((median or middle or center$4 or central$2) with (pixel or value or frequency or offset$4 or "off set$4" or off-set$4 or (pixel or voxel or ((picture or volume) with element))))	1929
☐	L24	L23 and ((map$4) with (field or slice or slab or plane))	1929
☐	L23	L22 and (map$4)	9922
☐	L22	L3 and ((percent$4 or amount$3 or number or total or ratio or threshold$3 or cutoff or "cut off" or cut-off) with (pixel or voxel or ((picture or volume) with element)))	28676

☐	L21	L13 and (median)	4
☐	L20	L18 and (median)	1
☐	L19	L18 and ((median or middle) with (pixel or voxel or ((picture or volume) with element)))	1
☐	L18	L17 and ((median or middle or center$4 or central$2) with (pixel or voxel or ((picture or volume) with element)))	12
☐	L17	L16 and ((suppress$4 or cancel$4 or cancellation or minimiz$5 or reduc$4) with (fat$2 or water or lipid))	12
☐	L16	L15 and (fat$2 or water or lipid)	26
☐	L15	L13 and (suppress$4 or cancel$4 or cancellation or minimiz$5 or reduc$4)	37
☐	L14	L13 and (suppress$4 or cancel$4 or cancellation or minimiz$5)	28
☐	L13	L12 and ((median or middle or center$4 or central$2) with (slice or plane or slab or volume))	38
☐	L12	L11 and ((percent$4 or amount$3 or number or total or ratio or threshold$3 or cutoff or "cut off" or cut-off) with (pixel or voxel or ((picture or volume) with element)))	97
☐	L11	L10 and (pixel or voxel or ((picture or volume) with element))	143
☐	L10	L9 and (field with map$4)	198
☐	L9	L8 and (even or odd or positive or negative or plus or minus or polarity or "up" or "down" or "above" or "below")	230
☐	L8	L7 and (percent$4 or amount$3 or number or total or ratio or threshold$3 or cutoff or "cut off" or cut-off)	233
☐	L7	L6 and ((map$4) with (field or slice))	236
☐	L6	L5 and (map$4)	1083
☐	L5	L4 and ((adjust$4 or correct$4 or alter$4 or modify$3 or modif$4 or control$4 or chang$4 or vary or varying or varied) with frequency)	3062
☐	L4	L3 and ((magnetic adj resonance) or MRI or NMR)	7320
☐	L3	((median or middle or center$4 or central$2) with (pixel or value or frequency or offset$4 or "off set$4" or off-set$4))	372179
☐	L2	(5541513| 5689186| 5869965| 5923168| 5926022)![pn]	10
☐	L1	6064205	9

END OF SEARCH HISTORY

Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs
Generate OACS

Search Results - Record(s) 1 through 23 of 23 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

L39: Entry 1 of 23 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 2. Document ID: US 20050033156 A1

L39: Entry 2 of 23 File: PGPB Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033156
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033156 A1

TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kruger, Gunnar	Erlangen		DE	
Thesen, Stefan	Erlangen		DE	

US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 3. Document ID: US 20050024051 A1

L39: Entry 3 of 23 File: PGPB Feb 3, 2005

PGPUB-DOCUMENT-NUMBER: 20050024051
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050024051 A1

TITLE: Correction of magnetic resonance images

PUBLICATION-DATE: February 3, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Doddrell, David M.	Brisbane		AU	
Zhao, Huawei	Brisbane		AU	

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 4. Document ID: US 20040254449 A1

L39: Entry 4 of 23 File: PGPB Dec 16, 2004

PGPUB-DOCUMENT-NUMBER: 20040254449
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040254449 A1

TITLE: System for concurrent MRI imaging and magnetic field homogeneity measurement

PUBLICATION-DATE: December 16, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Roopchansingh, Vinai	Milwaukee	WI	US	
Cox, Robert W.	Bethesda	MD	US	
Jesmanowicz, Andrzej	Wauwatosa	WI	US	
Hyde, James S.	Dousman	WI	US	

US-CL-CURRENT: 600/410; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 5. Document ID: US 20040128081 A1

L39: Entry 5 of 23 File: PGPB Jul 1, 2004

PGPUB-DOCUMENT-NUMBER: 20040128081
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040128081 A1

TITLE: Quantum dynamic discriminator for molecular agents

PUBLICATION-DATE: July 1, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Rabitz, Herschel	Lawrenceville	NJ	US	
Schreiber, Elmar	Bremen	PA	DE	
Levis, Robert J.	Rose Valley		US	

US-CL-CURRENT: 702/23; 702/27

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 6. Document ID: US 20040027127 A1

L39: Entry 6 of 23 File: PGPB Feb 12, 2004

PGPUB-DOCUMENT-NUMBER: 20040027127
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040027127 A1

TITLE: 4 dimensinal magnetic resonance imaging

PUBLICATION-DATE: February 12, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Mills, Randell L	Newtown	PA	US	

US-CL-CURRENT: 324/317

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 7. Document ID: US 20040010191 A1

L39: Entry 7 of 23 File: PGPB Jan 15, 2004

PGPUB-DOCUMENT-NUMBER: 20040010191
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040010191 A1

TITLE: Magnetic resonance imaging device and method

PUBLICATION-DATE: January 15, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Yatsui, Yumiko	Abiko-shi		JP	

US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 8. Document ID: US 20030156762 A1

L39: Entry 8 of 23 File: PGPB Aug 21, 2003

PGPUB-DOCUMENT-NUMBER: 20030156762
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030156762 A1

TITLE: Volterra filters for enhancement of contours in images

PUBLICATION-DATE: August 21, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
August, Jonas	Pittsburgh	PA	US	

US-CL-CURRENT: 382/260; 382/266

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 9. Document ID: US 20030118246 A1

L39: Entry 9 of 23 File: PGPB Jun 26, 2003

PGPUB-DOCUMENT-NUMBER: 20030118246
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030118246 A1

TITLE: Biased curve indicator random field filters for enhancement of contours in images

PUBLICATION-DATE: June 26, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
August, Jonas	Pittsburg	PA	US	

US-CL-CURRENT: 382/260; 382/266

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 10. Document ID: US 20030069497 A1

L39: Entry 10 of 23 File: PGPB Apr 10, 2003

PGPUB-DOCUMENT-NUMBER: 20030069497
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030069497 A1

TITLE: Magnetic field generating system and MRI system using magnetic field generating system

PUBLICATION-DATE: April 10, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Ochi, Hisaaki	Kodaira		JP	
Taniguchi, Yo	Kokubunji		JP	
Itagaki, Hiroyuki	Fuchu		JP	
Umemura, Shinichiro	Hachioji		JP	

US-CL-CURRENT: 600/422

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 11. Document ID: US 20020162947 A1

L39: Entry 11 of 23 File: PGPB Nov 7, 2002

PGPUB-DOCUMENT-NUMBER: 20020162947
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020162947 A1

TITLE: Mechanical sensors of electromagnetic fields

PUBLICATION-DATE: November 7, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Weitekamp, Daniel P.	Altadena	CA	US	
Lambert, Bruce	Pasadena	CA	US	

US-CL-CURRENT: 250/214R

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 12. Document ID: US 20010011889 A1

L39: Entry 12 of 23 File: PGPB Aug 9, 2001

PGPUB-DOCUMENT-NUMBER: 20010011889
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010011889 A1

TITLE: Magnetic resonance imaging device

PUBLICATION-DATE: August 9, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Golan, Erez	Tel Aviv		IL	

US-CL-CURRENT: 324/318; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

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☐ 13. Document ID: US 6835926 B2

L39: Entry 13 of 23 File: USPT Dec 28, 2004

US-PAT-NO: 6835926
DOCUMENT-IDENTIFIER: US 6835926 B2

TITLE: Mechanical sensors of electromagnetic fields

DATE-ISSUED: December 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Weitekamp; Daniel P.	Altadena	CA		
Lambert; Bruce	Pasadena	CA		

US-CL-CURRENT: 250/234; 250/225

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

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☐ 14. Document ID: US 6600319 B2

L39: Entry 14 of 23 File: USPT Jul 29, 2003

US-PAT-NO: 6600319
DOCUMENT-IDENTIFIER: US 6600319 B2
**** See image for Certificate of Correction ****

TITLE: Magnetic resonance imaging device

DATE-ISSUED: July 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY

Golan; Erez	Tel Aviv	IL

US-CL-CURRENT: 324/318; 324/303

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 15. Document ID: US 6490472 B1

L39: Entry 15 of 23 File: USPT Dec 3, 2002

US-PAT-NO: 6490472
DOCUMENT-IDENTIFIER: US 6490472 B1

TITLE: MRI system and method for producing an index indicative of alzheimer's disease

DATE-ISSUED: December 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Li; Shi-Jiang	Brookfield	WI		
Antuono; Piero	Wauwatosa	WI		
Li; Zhu	Milwaukee	WI		
Biswal; Bharat	Milwaukee	WI		
Hyde; James S.	Dousman	WI		
Ulmer; John L.	Brookfield	WI		
Yetkin; Zerrin F.	Dallas	TX		

US-CL-CURRENT: 600/410; 128/920

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 16. Document ID: US 6477398 B1

L39: Entry 16 of 23 File: USPT Nov 5, 2002

US-PAT-NO: 6477398
DOCUMENT-IDENTIFIER: US 6477398 B1

TITLE: Resonant magnetic susceptibility imaging (ReMSI)

DATE-ISSUED: November 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mills; Randell L.	Yardley	PA	19067	

US-CL-CURRENT: 600/409; 324/201, 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 17. Document ID: US 6177795 B1

L39: Entry 17 of 23 File: USPT Jan 23, 2001

US-PAT-NO: 6177795
DOCUMENT-IDENTIFIER: US 6177795 B1

TITLE: Spectral component imaging using phased array coils

DATE-ISSUED: January 23, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Zhu; Gang Gary	Fort Collins	CO		
Huang; Jian	Fort Collins	CO		
Hariharan; Hari	Fort Collins	CO		
Freeland; Stephen J.	Fort Collins	CO		

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 18. Document ID: US 6091243 A

L39: Entry 18 of 23 File: USPT Jul 18, 2000

US-PAT-NO: 6091243
DOCUMENT-IDENTIFIER: US 6091243 A

TITLE: Water-fat imaging with direct phase encoding (DPE)

DATE-ISSUED: July 18, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Xiang; Qing-San	Vancouver			CA
An; Li	Vancouver			CA

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 19. Document ID: US 5136243 A

L39: Entry 19 of 23 File: USPT Aug 4, 1992

US-PAT-NO: 5136243

DOCUMENT-IDENTIFIER: US 5136243 A

TITLE: Apparatus and element for mapping a static magnetic field

DATE-ISSUED: August 4, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Starewicz; Piotr M.	Plainfield	NJ		
Hillenbrand; David F.	Groveland	MA		

US-CL-CURRENT: 324/318; 324/301

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 20. Document ID: US 5005578 A

L39: Entry 20 of 23 File: USPT Apr 9, 1991

US-PAT-NO: 5005578
DOCUMENT-IDENTIFIER: US 5005578 A

TITLE: Three-dimensional magnetic resonance image distortion correction method and system

DATE-ISSUED: April 9, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Greer; Douglas S.	San Francisco	CA		
Gevins; Alan S.	San Francisco	CA		

US-CL-CURRENT: 600/414; 324/318, 600/421

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 21. Document ID: US 4876509 A

L39: Entry 21 of 23 File: USPT Oct 24, 1989

US-PAT-NO: 4876509
DOCUMENT-IDENTIFIER: US 4876509 A

TITLE: Image restoration process for magnetic resonance imaging resonance imaging

DATE-ISSUED: October 24, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Perlmutter; Robert J.	Palo Alto	CA		

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 22. Document ID: US 4761614 A

L39: Entry 22 of 23 File: USPT Aug 2, 1988

US-PAT-NO: 4761614
DOCUMENT-IDENTIFIER: US 4761614 A

TITLE: Device and method for automatic shimming of NMR instrument

DATE-ISSUED: August 2, 1988

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Prammer; Manfred G.	Philadelphia	PA		
Haselgrove; John C.	Swarthmore	PA		

US-CL-CURRENT: 324/320; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 23. Document ID: US 4720679 A

L39: Entry 23 of 23 File: USPT Jan 19, 1988

US-PAT-NO: 4720679
DOCUMENT-IDENTIFIER: US 4720679 A

TITLE: Magnetic resonance imaging with phase encoded chemical shift correction

DATE-ISSUED: January 19, 1988

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Patrick; John L.	Solon	OH		
Haacke; E. Mark	University Heights	OH		
Linga; Nagarjuna R.	Richmond Heights	OH		
Hahn; Janice E.	Solon	OH		

US-CL-CURRENT: 324/309; 324/312, 324/320

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MAGNETIC	1532097
MAGNETICS	13522
RESONANCE	306348
RESONANCES	17890
MRI	29236
MRIS	416
NMR	151610
NMRS	258
(27 AND (MRI OR (MAGNETIC ADJ RESONANCE) OR NMR)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	23
(L27 AND ((MAGNETIC ADJ RESONANCE) OR MRI OR NMR)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	23

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

L40: Entry 1 of 2 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 2. Document ID: US 6177795 B1

L40: Entry 2 of 2 File: USPT Jan 23, 2001

US-PAT-NO: 6177795
DOCUMENT-IDENTIFIER: US 6177795 B1

TITLE: Spectral component imaging using phased array coils

DATE-ISSUED: January 23, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Zhu; Gang Gary	Fort Collins	CO		
Huang; Jian	Fort Collins	CO		
Hariharan; Hari	Fort Collins	CO		
Freeland; Stephen J.	Fort Collins	CO		

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

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Term	Documents
NUMBER	5132144
NUMBERS	1273540
TOTAL	2079930
TOTALS	20362
RATIO	2299422
RATIOS	434900
PIXEL	253846
PIXELS	187860
VOXEL	4226
VOXELS	3391
PICTURE	523421
(L39 AND ((PERCENT$4 OR AMOUNT$3 OR NUMBER OR TOTAL OR RATIO) WITH (PIXEL OR VOXEL OR ((PICTURE OR VOLUME) WITH ELEMENT)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	2

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☐ 1. Document ID: US 20050093541 A1

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L42: Entry 1 of 1                        File: PGPB                    May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected
transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:
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Kolur, Hemalatha                    Bangalore             IN
Swaminathan, Venkata Ramanan        Bangalore             IN

US-CL-CURRENT: 324/309; 324/307
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Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

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Term	Documents
MEDIAN	92206
MEDIANS	1563
(39 AND MEDIAN).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	1
(L39 AND (MEDIAN)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	1

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☐ 1. Document ID: US 20050093541 A1

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L44: Entry 1 of 2 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

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US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 2. Document ID: US 20050033156 A1

L44: Entry 2 of 2 File: PGPB Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033156
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033156 A1

TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

PUBLICATION-DATE: February 10, 2005

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US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MEDIAN	92206
MEDIANS	1563
MIDDLE	697558
MIDDLES	2337
BO	299883
BOES	1112
BOS	13872
BOE	6395
B0	15409
B0S	12
"B.SUB.O"	3301
(L43 AND (((MEDIAN OR MIDDLE OR CENTER$4 OR CENTRAL$2) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	2

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L44: Entry 2 of 2 File: PGPB Feb 10, 2005

DOCUMENT-IDENTIFIER: US 20050033156 A1
TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

Abstract Paragraph:
In a method for calculating a one-dimensional map of the base magnetic field B0 and subsequent correction, based on this map, of image artifacts due to B0 field changes, in the examination of a subject with a magnetic resonance tomography apparatus, data for a slice of the subject to be examined are obtained with a sequence of a fast MRT imaging method that includes at least three phase correction scans and measurement signals of the respective phase correction scans as well as of the slice are obtained, the phase difference of the data points (respectively pertaining to one another) of two phase correction scans, in the form of the acquired measurement signals of the respective phase correction scans, are calculated point-by-point, the average phase difference between the phase correction scans is evaluated, and the frequency offset between the actual resonance frequency relative to the adjusted resonance frequency is calculated based on the average phase difference and the echo time difference between the phase correction scans used, a B0 field map is calculated dependent on the frequency offset and, the measurement data for the slice are corrected using the calculated B0 field map.

Summary of Invention Paragraph:
[0002] The present invention generally concerns magnetic resonance tomography (MRT) as employed in medicine for the examination of patients. The present invention is in particular concerned with a method for determination of the B0 (basic magnetic) field, in particular given the use of fast MRT imaging methods such as, for example, TSE, EPI, SSEPI. A projection obtained of the B0 field (B0 field map) of the acquired slice enables the correction of image artifacts arising due to changes in the B0 field.

Summary of Invention Paragraph:
[0004] MRT is based on the physical phenomenon of nuclear magnetic resonance and has been successfully used as an imaging method in medicine and biophysics for over 15 years. In this examination method, the subject is exposed to a strong, constant magnetic field. The nuclear spins of the atoms of the subject, which were previously oriented randomly, thereby align. Radio-frequency energy can now excite these "ordered" nuclear spins to a specific oscillation (resonant frequency). This oscillation generates the actual measurement signal (RF response signal) in MRT, which is acquired by suitable receiver coils. Using non-homogeneous magnetic fields generated by gradient coils, the measurement subject can be spatially coded in all three spatial directions, which is generally designated as a "spatial coding".

Summary of Invention Paragraph:
[0010] An EPI pulse sequence with a sinusoidally oscillating readout gradient and a constant phase coding gradient is shown in FIG. 5A. A constant phase coding gradient with sinusoidally oscillating readout gradient leads to a likewise sinusoidal sampling of the k-space, as is illustrated in FIG. 5b. The readout of

the echo series must be concluded within a time span that corresponds (in terms of magnitude) to the decay of the transverse magnetization. Otherwise, the various lines of the k-matrix would be too significantly differently weighted, depending on their sequence of detection. In addition to this, interferences of local field inhomogeneities increase with increasing readout time. Due to the necessity of such high measurement speeds, the echo planar technique places very high requirements on the gradient system (in practice, for example, gradient amplitudes of approximately 25 mT/m are used; in particular to change polarities of the gradient field, significant energies must be converted in the shortest possible time; the switching times are, for example, in the range of .ltoreq.0.3 ms). Due to the large (in comparison with many other MR imaging techniques) length of the readout train, typically of 20-150 ms, the EPI method is sensitive to B0 field interferences. Temporally constant static effects influence the quality of the image data. The B0 field can, with good approximation, be assumed as constant over the length of the readout train for the following observations. In the application of the EPI technique, however, data typically are acquired over a longer time span of multiple minutes up to an hour and more. Over these time spans, fluctuations of the B0 field can occur due to external interferences (for example, elevators, street traffic, etc. in the proximity of the base field magnet of an MRT apparatus) as well as due to apparatus instabilities (a B0 field drift of the scanner is always known in principle). For example, given the long time series of data sets that are measured with EPI, fluctuations of the absolute value of the otherwise homogenous B0 field cause visible subject displacements in the phase coding direction (typical values: given a 128.times.128 pixel matrix, corresponding to approximately 10 Hz, one voxel--1.5 mm--displacement). In the case of functional imaging, such apparent subject movements are reliably removed from the measurement data as movement correction technique (Friston et al, Hum. Brain Map. 2: 165-189, 1995). Given the combination of EPI with contrast agent-supported methods (perfusion imaging), however, these effects can be corrected only with difficulty because the successive images are very different due to the contrast agent bolus flowing therethrough. This can lead to errors or given a low residual signal in the images, to outright impossibility of the image analysis. A similar problem occurs in diffusion imaging. The individual images are typically significantly different due to the strength of the diffusion coding as well as the coding direction. Furthermore, in particular given stronger diffusion coding, the information must be measured multiple times in order to actually obtain an acceptable ratio of signal to noise. The data of a single acquisition are unusable for a correction due to the high noise portion. If, for example, the B0 field now changes during the diffusion measurement, the individual acquisitions are displaced relative to one another, and the resulting image quality can be impaired.

Summary of Invention Paragraph:
[0011] Moreover, not only are temporal changes of the B0 field problematic, but also the variation of the absolute value of B0 across the sample or the patient to be examined. Normally, only B0 field deviations of the first and second order can be compensated by active and/or passive shimming. B0 field deviations of a higher order cause a residual curve of the B0 field of some 10 to 100 Hz in the homogeneity volume that cannot be corrected. Signals within the selected slice are possibly acquired off-resonance. In the case of echo planar imaging, this in turn leads to an apparent displacement of the measurement subject, meaning the planned or calculated image position (slice position) is typically incorrect by a few millimeters (up to centimeters). Problems with the interpretation and further use of the obtained images--for example given overlay with other measurement results for further planning of the examination and/or therapy--can result from this.

Summary of Invention Paragraph:
[0012] Conventionally in the case of echo planar imaging, artifacts due to temporal changes of the B0 field can be compensated under certain conditions. A prevalent method for this is known as "image matching": a displacement or a drift of the subject in successive images is back-projected, by the rotation and/or translation

being determined in which, for example, the difference of both images is minimal at the pixel level. In the case of imaging methods with significant contrast changes (such as, for example, diffusion imaging, perfusion imaging), however, this method frequently cannot be successfully used (given contrast changes, a comparison of the acquired data is increasingly more difficult). In addition, the image data of all individual acquisitions must exhibit a sufficiently high signal-to-noise ratio.

Summary of Invention Paragraph:
[0013] A further method for compensation of the effects occurring due to temporal changes of the B0 field is described in Durand (Durand et al., Journal of Magnetic Resonance in Medicine 46: 198-201, 2001): at each measurement (scan of the k-matrix), the phase of the middle (central) k-space line is averaged over the line, and this value is compared with the averaged phase of the preceding measurement (same slice) of the same line. Given B0 field fluctuations, averaged successive phases will be different. By comparison of the phases the B0 field, changes can be detected and the image can be correspondingly corrected and back-projected.

Summary of Invention Paragraph:
[0015] An object of the present invention is to provide a method with which, in a simple manner and for every MRT apparatus, in particular for functional, contrast agent-aided and diffusion measurement methods, during the measurement the B0 field can be quantified for each slice absolutely or relative to the beginning of the measurement, and on this basis a correction can be effected only in the image plane or in k-space.

Summary of Invention Paragraph:
[0016] This object is achieved according to the invention by a method for calculation of a one-dimensional map of the basic magnetic field B0 and subsequent correction, based on this map, of image artifacts due to B0 field changes, in the examination of a subject with a magnetic resonance tomography apparatus, including the steps of measuring data of a slice of the subject to be examined with a sequence of a fast MRT imaging method that includes at least three phase correction scans and acquiring measurement signals for the respective phase correction scans as well as of the slice, calculating the phase difference of the data points point-by-point (respectively pertaining to one another) for two phase correction scans in the form of the acquired measurement signals of the respective phase correction scans, evaluating of the average phase difference between the phase correction scans, calculating the frequency offset between the actual resonant frequency relative to the adjusted resonant frequency based on the average phase difference and the echo time difference between the phase correction scans used, calculating a B0 field map dependent on this frequency offset, correcting the measurement data for the slice using the calculated B0 field map.

Summary of Invention Paragraph:
[0020] The above object also is achieved in accordance with the invention by a method for calculation of a one-dimensional map of the base magnetic field B0 and subsequent correction, based on this map, of image artifacts due to B0 field changes, in the examination of a subject by means of a magnetic resonance tomography apparatus, including the steps of measuring data of a slice of the subject to be examined with a sequence of a fast MRT imaging method that includes one phase correction scan and acquiring measurement signals of the phase correction scan as well as of the slice, calculating an average value of the data points point-by-point (respectively pertaining to one another) for the phase correction scan as well as of the middle k-space line of the slice in the form of the acquired measurement signals, calculating the average phase difference between the phase correction scan and the middle k-space line on the basis of the average value, calculating the frequency offset between the actual resonant frequency relative to the adjusted resonant frequency based on the average phase difference and the time difference between the phase correction scan and the passage of the middle k-space line, calculating a B0 field map dependent on this frequency offset, correcting of

the measurement data for the slice using the calculated B0 field map.

Summary of Invention Paragraph:
[0021] In both of the inventive methods, the calculation of the B0 field map can ensue either by calculation of the absolute value of the B0 field relative to the gyromagnetic ratio or by calculation of the change of the B0 field relative to the beginning of the measurement.

Summary of Invention Paragraph:
[0023] The MRT images corrected on the basis of the B0 field map, in accordance with the invention, correctly overlaid with anatomical high-resolution images.

Summary of Invention Paragraph:
[0027] The above object also is achieved in accordance with the present invention by a magnetic resonance tomography apparatus operable in accordance with the above-described method.

Brief Description of Drawings Paragraph:
[0028] FIG. 1 is a schematic block diagram of a magnetic resonance tomography apparatus constructed and operating in accordance with the invention.

Brief Description of Drawings Paragraph:
[0030] FIG. 3A shows the time curve of the determined phase of the B0 field along the k-space line during the measurement.

Brief Description of Drawings Paragraph:
[0031] FIG. 3B shows the position of the subject via plotting of the signal magnitude dependent on the pixel number.

Detail Description Paragraph:
[0035] FIG. 1 is a schematic representation of a magnetic resonance tomography apparatus operable pulses according to the present invention. The design of the nuclear magnetic resonance tomography apparatus corresponds to the design of a conventional tomography apparatus, with the differences described below. A basic field magnet 1 generates a temporally constant strong magnetic field B0 to polarize or align the nuclear spins in the examination region of a subject such as, for example, a part of a human body to be examined. The high homogeneity of the basic field magnet required for the magnetic resonance measurement is defined in a spherical measurement volume M into which the parts of the human body to be examined are inserted. To support the homogeneity requirements, and in particular to eliminate temporally invariable influences, shim plates made of ferromagnetic material are mounted at appropriate locations. Temporally variable influences are eliminated by shim coils 2 that are controlled by a shim power supply 15.

Detail Description Paragraph:
[0037] Within the gradient field system 3 is a radio-frequency antenna 4 that converts the radio-frequency pulse emitted by a radio-frequency power amplifier 30 into an electromagnetic alternating field to excite the nuclei and align the nuclear spins of the subject to be examined, or of the region of the subject to be examined. The alternating field originating from the precessing nuclear spins, meaning as a rule the nuclear spin echo signals ensuing from a pulse sequence composed of one or more radio-frequency pulses and one or more gradient pulses, is also converted by the radio-frequency antenna 4 into a voltage that is supplied via an amplifier 7 to a radio-frequency reception channel 8 of a radio-frequency system 22. The radio-frequency system 22 furthermore has a transmission channel 9 in which the radio-frequency pulses are generated for the excitation of the magnetic resonance. The respective radio-frequency pulses are digitally represented in the sequence control 18 as a sequence of complex numbers based on a pulse sequence predetermined by the system computer 20. This number sequence is respectively supplied inputs 12 as a real part and an imaginary part to a digital-analog

converter in the radiation detector system 22, and supplied from this to a transmission channel 9. In the transmission channel 9, the pulse sequences are modulated by a radio-frequency carrier signal the base frequency of which corresponds to the resonant frequency of the nuclear spins in the measurement volume.

Detail Description Paragraph:
[0038] Switching between the transmission modes to reception mode ensues via a transmission-reception diplexer 6. The radio-frequency antenna 4 radiates the radio-frequency pulses to excite the nuclear spins in the measurement volume M and samples resulting echo signals. The acquired magnetic resonance signals are phase-sensitively demodulated in the reception channel 8 of the radio-frequency system 22 and are converted via respective digital-analog converters into a real part and an imaginary part of the measurement signal. An image is reconstructed by an image computer 17 from the measurement data acquired in such a manner. The administration of the measurement data, the image data and the control program ensues via the system computer 20. Based on a specification with control programs, the sequence control 18 monitors the generation of the respective desired pulse sequences and the corresponding scanning of k-space. In particular, the sequence control 18 controls the timed switching of the gradients, the emission of the radio-frequency pulses with defined phase and amplitude, and the reception of the magnetic resonance signals. The time base for the radio-frequency system 22 and the sequence control 18 is provided by a synthesizer 19. The selection of corresponding control programs to generate a magnetic resonance image, as well as the representation of the generated magnetic resonance image, ensues via a terminal 21 that has a keyboard as well as one or more screens.

Detail Description Paragraph:
[0041] The basis for the present invention is to subject such PC scans to a second analysis in order to acquire further information regarding the B0 field--for example, to create a one-dimensional B0 field map. In accordance with the invention three PC scans are used that, according to the EPI sequence in FIG. 2, scan the central k-space line three times immediately after the RF excitation pulse and before a phase coding. The first line shows the signals acquired by the ADC (ADC signals). The second line shows the sinusoidal behavior of the readout gradient (x-gradient) both in the three PC measurements and in the subsequently readout train. Line three shows the signal of the phase coding gradient (y-gradient) immediately after the third PC scan, line four shows the slice selection gradient (z-gradient) immediately after the RF excitation pulse in line five. Signals before the RF excitation pulse serve for the rephasing and dephasing as well as for fat saturation and are not considered in the following.

Detail Description Paragraph:
[0043] The following explains how the phase difference between both of the echoes of the considered PC scans can be used to quantify the B0 field:

Detail Description Paragraph:
[0050] Finally, the actual resonance frequency can be determined from the frequency offset and the adjusted resonance frequency V.sub.adjusted. Thus the absolute value of the local B0 field can also be determined per slice via the gyromagnetic ratio .gamma.: 4 B0 = 1 v adjusted + v

Detail Description Paragraph:
[0051] The method enables effects of a B0 offset as well as temporal B0 field fluctuations to be simultaneously corrected. For example, a B0 offset can be converted into a translation phase that can be used to correct the measured data.

Detail Description Paragraph:
[0054] It is a single-shot method, meaning all necessary information is acquired after a single RF excitation. Thus no comparison of information or, respectively,

calculation of information (see Durand et al.) occurs over a number of excitations. A B0 correction is thus also possible in applications in which a phase coherency between the individual excitations does not occur (for example perfusion measurement and diffusion measurement).

Detail Description Paragraph:
[0057] In contrast to prevalent movement correction methods, in which apparent (induced via B0 fluctuations) and real subject movement are mixed and thus can no longer be separated, in the inventive method exclusively the B0 field effects are detected (for specific evaluations the real movement information or, respectively, the content of the real subject movement is necessary).

Detail Description Paragraph:
[0063] Since a GRE sequence is more intensive or, respectively, susceptible (generally by at least one to two orders of magnitude) to B0 field interferences than an EPI sequence, the GRE measurement can here be viewed as a reference. From the result data, it is clearly visible that the position of the structure of the measurement phantom in the corrected EPI measurement completely coincides with that of the GRE measurement. However, the structure position in the uncorrected EPI measurement deviates significantly. The correct function of the absolute quantification of the B0 field is thus confirmed.

Detail Description Paragraph:
[0064] In a second test, the inventive method was tested with regard to its precision, in particular in a time series analysis as it is, for example, implemented in the framework of an fMRT application. For this, a time series of 100 EPI data sets of a measurement phantom was acquired. FIG. 4 shows the position of a slice in the course of a measurement in voxel units. An offset of approximately 0.4 voxels (1.2 mm) is visible as a start value, meaning the image of the measured slice is displaced by 1.2 mm in the direction of the phase coding gradient due to a frequency offset caused by B0 deviation. Due to a drift of the B0 field, the image position--as is clear using the diagram--changes by a total of 0.25 voxels (0.75 mm) in the course of the measurement. This means that the hundredth image of the slice is displaced by a quarter-voxel relative to the first image of the slice, and therefore both or all images of this time series can be compared absolutely. If it is assumed that the B0 field does not change significantly from measurement to measurement, the error of this method in this example can be roughly estimated using the relative distribution of the adjacent slice positions with approximately .+-.0.03 voxels (.+-.0.09 mm). Overall, the method is thus precise enough in order to correct apparent movements due to B0 fluctuations--specifically in an fMRT application. If one converts the errors of the slice position determination into an error of the frequency determination (the bandwidth of an EPI sequence in the phase coding direction for the example is 28.8 Hz/pixel), a frequency displacement of .DELTA.v=.+-.1 Hz results.

Detail Description Paragraph:
[0065] A further advantage of the inventive method is a simultaneous correction, implicitly given by the method, of further magnetic field inhomogeneities, caused by the applied gradient, that overlie the base field in addition to the statistical field inhomogeneities in the form of terms known as "Maxwell terms". If one considers the basic magnetic field B.sub.0, which is overlaid by a strong linear gradient in the x-direction G.sub.x, a resulting magnetic field {right arrow over (B)} is obtained in the form

Detail Description Paragraph:
[0070] As is to be seen from this, the magnitude is composed of not only the homogenous components of the basic field B0 and the linear components of the gradient in the x-direction G.sub.xx, but also of a "Maxwell term" (G.sub.zz).sup.2/(2B.sub.0) that is proportional to the square of z and to the square of the gradient amplitude, as well as indirectly proportional to

B.sub.0. This term effectively leads to a new resonant frequency with a frequency shift.omega..sub.eff (frequency offset) of

Detail Description Paragraph:
[0075] is increasingly more influential the smaller the base field B.sub.0, and

Detail Description Paragraph:
[0079] A) During an MRT imaging method (for example, EPI), B0 field offsets are permanently corrected via the inventive evaluation during the measurement. The image position thus remains stable in the phase coding correction during the measurement, and thus also corresponds to the calculated image position.

Detail Description Paragraph:
[0080] B) Anatomical high-resolution data (for example, images of a spin echo sequence) are overlaid on the images (fMRT maps, perfusion maps, diffusion maps etc.) acquired via the inventive imaging method (for example, EPI). Via the inventive method, the image positions of the inventive method coincide with the anatomical high-resolution measurement. Error associations are thus reduced or eliminated.

Detail Description Paragraph:
[0082] D) Instead of calculating the B0 field map exclusively from PC scans, this can also be determined from a PC scan and the average phase of the middle k-space line. It should be noted that both are acquired in the same direction. The advantage is the larger time difference of both acquisitions, during which a larger phase can be established, and the method thus modified is therefore more sensible.

Detail Description Paragraph:
[0083] E) Given segmented measurements in which the k-matrix is scanned in blocks or in segments (typically with TSE, EPI or SSEPI), image artifacts based on different B0 magnetic fields can be prevented in the acquisition of the different blocks or segments.

Detail Description Paragraph:
[0084] F) Given spectroscopic measurements in which a spectrum is typically measured across a plurality of minutes, with the specified method (thus interleaving or, respectively, incorporation of PC scans in the spectroscopic measurement) current B0 field determinations can be implemented. Interferences by B0 field fluctuations that, for example, would cause a peak broadening hereby fall away. Given an interleaving (PC scans between the 90.degree. and 180.degree. pulses) and therewith a simultaneous use of the excitation pulse, advantageously as well no measurement time extension occurs.

Detail Description Paragraph:
[0085] G) In the event that an interleave of the PC scans or, respectively, the implementation of the PC scan measurement in the actual measurement sequence is unwanted (for example for time reasons), the PC scans can also be acquired via additional excitation pulses between the actual measurement sequences, and thus the current B0 field value can be obtained. In order to prevent a saturation of the magnetic resonance, preferably no flip angle should then be used for the respective PC scan measurement. In this case, the excitation volume of the PC scan measurement does not have to be identical with the excitation volume of the slice to be measured (for example, an excitation of the entire measurement volume would be conceivable).

Detail Description Paragraph:
[0086] H) After calculation of the phase difference of the PC scan, for example, a linear compensation line or a function of higher order is calculated, whereby the magnitude represents an index for the validity of the phase information. With the aid of this information, the shim of the basic field in the readout gradient can be

corrected for the currently acquired slice. A correction of the measurement data can also ensue using this information. Statistical and dynamic effects that lead to an imperfect curve of the B0 field can hereby be corrected for each slice.

CLAIMS:

1. A method for calculating a one-dimensional map of a basic magnetic field (B0) for correcting image artifacts in a magnetic resonance tomographic image due to changes in the basic magnetic field, comprising the steps of: obtaining magnetic resonance data from a slice of an examination subject using a fast magnetic resonance tomography imaging sequence comprising at least three phase correction scans, and acquiring measurement signals representing data points for each of said phase correction scans; calculating a phase difference between corresponding data points respectively in two of said phase correction scans for all data points in said two of said phase correction scans on a point-by-point basis; identifying an average phase difference for said two of said phase correction scans; determining an adjusted resonant frequency from said average phase difference and from echo time differences between said two of said phase correction scans, and calculating a frequency offset between an actual resonant frequency and said adjusted resonant frequency; calculating a B0 field map of said B0 field dependent on said frequency offset; and correcting said magnetic resonance data for said slice using said B0 field map.

5. A method as claimed in claim 4 comprising the additional step of, dependent on said mathematical function, correcting shimming of B0 field in a readout direction before correcting said magnetic resonance data.

6. A method as claimed in claim 1 comprising calculating said B0 field map by calculating an absolute value of said B0 field versus the gyromagnetic ratio.

7. A method as claimed in claim 1 comprising calculating said B0 field map by calculating a change of said B0 field relative to said B0 field at a beginning of said sequence.

8. A method as claimed in claim 1 comprising obtaining said measurement signals for said plurality of phase correction scans in an execution of said sequence independent of an execution of said sequence for obtaining said magnetic resonance data of said slice.

10. A method as claimed in claim 1 comprising generating an image of said slice from said measurement data corrected with said B0 field map, and overlaying said image with an anatomical high-resolution image.

12. A method as claimed in claim 1 wherein said sequence is a magnetic resonance spectroscopic sequence, and wherein said magnetic resonance data are spectroscopic data obtained in spectroscopic measurements in said sequence, and comprising arbitrarily interleaving said phase correction scans with said spectroscopic measurements.

14. A method for calculating a one-dimensional map of a basic magnetic field (B0) for correcting image artifacts in a magnetic resonance tomographic image due to changes in the basic magnetic field, comprising the steps of: obtaining magnetic resonance data of a slice of an examination subject in a fast magnetic resonance sequence and entering said magnetic resonance data as data points into a k-space matrix having a plurality of lines, including a middle line, and in said sequence, conducting one phase correction scan and acquiring measurement signals, representing phase correction data points, for said one phase correction scan; calculating an average value of corresponding data points of said phase correction scan and of said middle line of said k-space matrix on a point-by-point basis; from said average value, calculating an average phase difference between said one phase

correction scan and said middle line of said k-space matrix; calculating an adjusted resonant frequency from said average phase difference and a time difference between said phase correction scan and passage of said middle line of said k-space matrix, and calculating a frequency offset between an actual resonant frequency and said adjusted resonant frequency; calculating a B0 field map of said basic magnetic field dependent on said frequency offset; and correcting said magnetic resonance data for said slice using the calculated B0 field map.

15. A method as claimed in claim 14 comprising calculating said B0 field map by calculating an absolute value of said B0 field versus the gyromagnetic ratio.

16. A method as claimed in claim 14 comprising calculating said B0 field map by calculating a change of said B0 field relative to said B0 field at a beginning of said sequence.

17. A method as claimed in claim 14 comprising obtaining said measurement signals for said plurality of phase correction scans in an execution of said sequence independent of an execution of said sequence for obtaining said magnetic resonance data of said slice.

19. A method as claimed in claim 14 comprising generating an image of said slice from said measurement data corrected with said B0 field map, and overlaying said image with an anatomical high-resolution image.

21. A method as claimed in claim 14 wherein said sequence is a magnetic resonance spectroscopic sequence, and wherein said magnetic resonance data are spectroscopic data obtained in spectroscopic measurements in said sequence, and comprising arbitrarily interleaving said phase correction scans with said spectroscopic measurements.

23. A magnetic resonance tomography apparatus, comprising the steps of: obtaining magnetic resonance data from a slice of an examination subject using a fast magnetic resonance tomography imaging sequence comprising at least three-phase correction scans, and acquiring measurement signals representing data points for each of said phase correction scans; calculating a phase difference between corresponding data points respectively in two of said phase correction scans for all data points in said two of said phase correction scans on a point-by-point basis; identifying an average phase difference for said two of said phase correction scans; determining an adjusted resonant frequency from said average phase difference and from echo time differences between said two of said phase correction scans, and calculating a frequency offset between an actual resonant frequency and said adjusted resonant frequency; calculating a B0 field map of said B0 field dependent on said frequency offset; and correcting said magnetic resonance data for said slice using said B0 field map.

24. A magnetic resonance tomography apparatus comprising the steps of: obtaining magnetic resonance data of a slice of an examination subject in a fast magnetic resonance sequence and entering said magnetic resonance data as data points into a k-space matrix having a plurality of lines, including a middle line, and in said sequence, conducting one phase correction scan and acquiring measurement signals, representing phase correction data points, for said one phase correction scan; calculating an average value of corresponding data points of said phase correction scan and of said middle line of said k-space matrix on a point-by-point basis; from said average value, calculating an average phase difference between said one phase correction scan and said middle line of said k-space matrix; calculating an adjusted resonant frequency from said average phase difference and a time difference between said phase correction scan and passage of said middle line of said k-space matrix, and calculating a frequency offset between an actual resonant frequency and said adjusted resonant frequency; calculating a B0 field map of said basic magnetic field dependent on said frequency offset; and correcting said

magnetic resonance data for said slice using the calculated B0 field map.

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

L45: Entry 1 of 2 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 2. Document ID: US 20050033156 A1

L45: Entry 2 of 2 File: PGPB Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033156
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033156 A1

TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kruger, Gunnar	Erlangen		DE	
Thesen, Stefan	Erlangen		DE	

US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MEDIAN	92206
MEDIANS	1563
MIDDLE	697558
MIDDLES	2337
VALUE	3325797
VALUES	1647060
NUMBER	5132144
NUMBERS	1273540
AMOUNT	3897490
AMT	331877
AMTS	63018
((((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) WITH (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	2

There are more results than shown above. Click here to view the entire set.

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L45: Entry 2 of 2 File: PGPB Feb 10, 2005

DOCUMENT-IDENTIFIER: US 20050033156 A1
TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

Summary of Invention Paragraph:
[0020] The above object also is achieved in accordance with the invention by a method for calculation of a one-dimensional map of the base magnetic field B0 and subsequent correction, based on this map, of image artifacts due to B0 field changes, in the examination of a subject by means of a magnetic resonance tomography apparatus, including the steps of measuring data of a slice of the subject to be examined with a sequence of a fast MRT imaging method that includes one phase correction scan and acquiring measurement signals of the phase correction scan as well as of the slice, calculating an average value of the data points point-by-point (respectively pertaining to one another) for the phase correction scan as well as of the middle k-space line of the slice in the form of the acquired measurement signals, calculating the average phase difference between the phase correction scan and the middle k-space line on the basis of the average value, calculating the frequency offset between the actual resonant frequency relative to the adjusted resonant frequency based on the average phase difference and the time difference between the phase correction scan and the passage of the middle k-space line, calculating a B0 field map dependent on this frequency offset, correcting of the measurement data for the slice using the calculated B0 field map.

Average phase of middle line on basis of Average Value is not a "Median Value" which is either the middle Value or the Average of the two Center Numbers of the middle line of Signal Data

Also the date of this Reference is no good

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Search Results - Record(s) 1 through 10 of 10 returned.

☐ 1. Document ID: US 20050093541 A1

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L46: Entry 1 of 10 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 2. Document ID: US 20050033156 A1

L46: Entry 2 of 10 File: PGPB Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033156
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033156 A1

TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kruger, Gunnar	Erlangen		DE	
Thesen, Stefan	Erlangen		DE	

US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 3. Document ID: US 20040140802 A1

L46: Entry 3 of 10 File: PGPB Jul 22, 2004

PGPUB-DOCUMENT-NUMBER: 20040140802
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040140802 A1

TITLE: Measurement and correction of gradient-induced cross-term magnetic fields in an EPI sequence

PUBLICATION-DATE: July 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Zhang, Weiguo	Foster City	CA	US	

US-CL-CURRENT: 324/307; 324/300, 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 4. Document ID: US 6836113 B2

L46: Entry 4 of 10 File: USPT Dec 28, 2004

US-PAT-NO: 6836113
DOCUMENT-IDENTIFIER: US 6836113 B2

TITLE: Measurement and correction of gradient-induced cross-term magnetic fields in an EPI sequence

DATE-ISSUED: December 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Zhang; Weiguo	Foster City	CA		

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 5. Document ID: US 6489736 B1

L46: Entry 5 of 10 File: USPT Dec 3, 2002

US-PAT-NO: 6489736

DOCUMENT-IDENTIFIER: US 6489736 B1

TITLE: Color cathode ray tube apparatus

DATE-ISSUED: December 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ueno; Hirofumi	Fukaya			JP
Satou; Kazunori	Fukaya			JP
Takekawa; Tsutomu	Fukaya			JP

US-CL-CURRENT: 315/382; 313/412, 315/15

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw. D

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6. Document ID: US 5399830 A

L46: Entry 6 of 10 File: USPT Mar 21, 1995

US-PAT-NO: 5399830
DOCUMENT-IDENTIFIER: US 5399830 A

TITLE: Plasma treatment apparatus

DATE-ISSUED: March 21, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Maruyama; Takahiro	Hyogo			JP

US-CL-CURRENT: 219/121.43; 156/345.38, 204/298.16, 204/298.37, 204/298.38, 219/121.42

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw. D

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7. Document ID: US 4887029 A

L46: Entry 7 of 10 File: USPT Dec 12, 1989

US-PAT-NO: 4887029
DOCUMENT-IDENTIFIER: US 4887029 A

TITLE: Mutual inductance current transducer, method of making and electric energy meter incorporating same

DATE-ISSUED: December 12, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY

Hemminger; Rodney C. Raleigh NC

US-CL-CURRENT: 324/142; 324/107, 324/127

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 8. Document ID: EP 243270 A, DE 3763522 G, EP 243270 B, FR 2597977 A, JP 62256418 A, US 4833410 A

L46: Entry 8 of 10 File: DWPI Oct 28, 1987

DERWENT-ACC-NO: 1987-300900
DERWENT-WEEK: 198743
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TITLE: Winding system for polarising field on NMR body scanner - uses Legendre polynomials to design offset or overlapping windings around cylinder with cylinder radius used in determination

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 9. Document ID: US 3364461 A

L46: Entry 9 of 10 File: USOC Jan 16, 1968

US-PAT-NO: 3364461
DOCUMENT-IDENTIFIER: US 3364461 A

TITLE: Transducer array with constant pressure, plane wave near-field

DATE-ISSUED: January 16, 1968

INVENTOR-NAME: TROTT WINFIELD J

US-CL-CURRENT: 367/153; 343/824, 343/844, 343/853, 367/13, 367/905

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

☐ 10. Document ID: US 2957097 A

L46: Entry 10 of 10 File: USOC Oct 18, 1960

US-PAT-NO: 2957097
DOCUMENT-IDENTIFIER: US 2957097 A

TITLE: Cathode ray tube

DATE-ISSUED: October 18, 1960

INVENTOR-NAME: ALBERT EASTWELL BERNARD; PIETER SCHAGEN ; RITCHIE CALDER NIGEL DAVID

US-CL-CURRENT: 313/422, 126/9B, 313/408, 315/366

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw. D

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MEDIAN	92206
MEDIANS	1563
MIDDLE	697558
MIDDLES	2337
VALUE	3325797
VALUES	1647060
NUMBER	5132144
NUMBERS	1273540
AMOUNT	3897490
AMT	331877
((((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) WITH (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4 OR DISTRIBUTION)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	10

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20050093541 A1

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L47: Entry 1 of 2 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KMC | Draw. De

☐ 2. Document ID: US 2957097 A

L47: Entry 2 of 2 File: USOC Oct 18, 1960

US-PAT-NO: 2957097
DOCUMENT-IDENTIFIER: US 2957097 A

TITLE: Cathode ray tube

DATE-ISSUED: October 18, 1960

INVENTOR-NAME: ALBERT EASTWELL BERNARD; PIETER SCHAGEN ; RITCHIE CALDER NIGEL DAVID

US-CL-CURRENT: 313/422, 126/9B, 313/408, 315/366

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KMC | Draw. De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MEDIAN	92206
MEDIANS	1563
MIDDLE	697558
MIDDLES	2337
VALUE	3325797
VALUES	1647060
NUMBER	5132144
NUMBERS	1273540
AMOUNT	3897490
AMT	331877
AMTS	63018
((((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) ADJ (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4 OR DISTRIBUTION)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	2

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Search Results - Record(s) 1 through 1 of 1 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

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L49: Entry 1 of 1                       File: PGPB                  May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected
transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:
NAME                                CITY        STATE   COUNTRY    RULE-47
Agilandam, Kasi Viswanathan         Bangalore           IN
Mariappan, Masanam                  Bangalore           IN
Kolur, Hemalatha                    Bangalore           IN
Swaminathan, Venkata Ramanan        Bangalore           IN

US-CL-CURRENT: 324/309; 324/307
```

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents
MAGNETIC	1532097
MAGNETICS	13522
RESONANCE	306348
RESONANCES	17890
MRI	29236
MRIS	416
NMR	151610
NMRS	258
MEDIAN	92206

MEDIANS	1563
MIDDLE	697558
((((MAGNETIC ADJ RESONANCE) OR MRI OR NMR) AND (((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) ADJ (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4 OR DISTRIBUTION)) WITH (SLICE OR SLAB OR PLANE)))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	1

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Search Results - Record(s) 1 through 4 of 4 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

L54: Entry 1 of 4 File: PGPB May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Agilandam, Kasi Viswanathan	Bangalore		IN	
Mariappan, Masanam	Bangalore		IN	
Kolur, Hemalatha	Bangalore		IN	
Swaminathan, Venkata Ramanan	Bangalore		IN	

US-CL-CURRENT: 324/309; 324/307

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 2. Document ID: US 20050033156 A1

L54: Entry 2 of 4 File: PGPB Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033156
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033156 A1

TITLE: Method and magnetic resonance tomography apparatus for correcting changes in the basic magnetic field

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kruger, Gunnar	Erlangen		DE	
Thesen, Stefan	Erlangen		DE	

US-CL-CURRENT: 600/410

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 3. Document ID: US 20040140802 A1

L54: Entry 3 of 4 File: PGPB Jul 22, 2004

PGPUB-DOCUMENT-NUMBER: 20040140802
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040140802 A1

TITLE: Measurement and correction of gradient-induced cross-term magnetic fields in an EPI sequence

PUBLICATION-DATE: July 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Zhang, Weiguo	Foster City	CA	US	

US-CL-CURRENT: 324/307; 324/300, 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 4. Document ID: US 6836113 B2

L54: Entry 4 of 4 File: USPT Dec 28, 2004

US-PAT-NO: 6836113
DOCUMENT-IDENTIFIER: US 6836113 B2

TITLE: Measurement and correction of gradient-induced cross-term magnetic fields in an EPI sequence

DATE-ISSUED: December 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Zhang; Weiguo	Foster City	CA		

US-CL-CURRENT: 324/307; 324/309

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw D

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Term	Documents

MEDIAN	92206
MEDIANS	1563
MIDDLE	697558
MIDDLES	2337
VALUE	3325797
VALUES	1647060
NUMBER	5132144
NUMBERS	1273540
AMOUNT	3897490
AMT	331877
AMTS	63018
(L53 AND (((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) WITH (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4 OR DISTRIBUTION)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	4

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Search Results - Record(s) 1 through 1 of 1 returned.

☐ 1. Document ID: US 20050093541 A1

Using default format because multiple data bases are involved.

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L55: Entry 1 of 1                    File: PGPB                    May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050093541
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050093541 A1

TITLE: Method and system for optimized pre-saturation in MR with corrected
transmitter frequency of pre-pulses

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:
NAME                                CITY         STATE   COUNTRY   RULE-47
Agilandam, Kasi Viswanathan         Bangalore            IN
Mariappan, Masanam                  Bangalore            IN
Kolur, Hemalatha                    Bangalore            IN
Swaminathan, Venkata Ramanan        Bangalore            IN

US-CL-CURRENT: 324/309; 324/307
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Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

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VALUE	3325797
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(L53 AND (((MEDIAN OR (MIDDLE OR CENTER$4 OR CENTRAL$2) ADJ (VALUE OR NUMBER OR AMOUNT OR TOTAL)) WITH ("BO" OR "B0" OR "B.SUB.O" OR "B.SUB.0" OR ((STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY) WITH (MAGNETIC OR FIELD))) WITH (MAP$4 OR DISTRIBUTION)) WITH (SLICE OR SLAB OR PLANE))).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	1

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10696947

NPL STIC Search (text)
8-16-2005
Databases, Search History, & Results

? d s

Set Items Description

S1 1922434 S MRI OR MAGNETIC(1W)(IMAG? OR IMAGING) OR MAGNETIC(W)RESONAN? OR NMR OR NUCLEAR()MAGNETIC()RESONANCE OR FTNMR OR FTMRI OR MAGNETORESONANCE OR PMR OR PROTON(W)MAGNETIC(W)RESONAN? OR MR()(IMAGE? OR IMAGING)

S2 7402 S MC=(S01-E02A2 OR S03-E07A OR S01-E02A8A OR S01-E02A1 OR S03-E07C OR S05-D02B1 OR S03-C02F1)

S3 48761 IC=(G01N-024/08 OR G01V-003/A75 OR G01R-033/56F OR G01V-003/00) FROM 2, 155, 5, 6, 8, 73, 94, 35, 144, 105, 99, 58, 34, 434, 292, 89, 65, 360, 239, 347, 305, 350, 162, 164, 357, 315, 23

S4 21979 S CC=(A0758 OR A8760I OR B7510N)

S5 1958880 S S1:S4

S6 814217 S MEDIAN OR (MIDDLE OR CENTER???? OR CENTRAL????)(3N)(VALUE OR NUMBER OR AMOUNT OR TOTAL)

S7 224390 S BO OR B()O OR (STATIC OR MAIN OR UNIFORM OR CONSTANT OR PRIMARY)(3N)(MAGNETIC OR FIELD)

S8 87 S S5 AND S6 AND S7

S9 1532 S SCAN()(SLICE? OR SLAB? OR PLANE? OR PLANAR?)

S10 0 S S9 AND S8

S11 57 RD S8 (unique items)

S12 2 S S11 AND (PIXEL? OR PERCENTAG?)

S13 55 S S11 NOT S12

S14 4 S S13 AND PD<=20031030

? show files

[File 2] **INSPEC** 1969-2005/Aug W1

[File 155] **MEDLINE(R)** 1951-2005/Aug W2

[File 5] **Biosis Previews(R)** 1969-2005/Aug W1

[File 6] **NTIS** 1964-2005/Aug W1

[File 8] **Ei Compendex(R)** 1970-2005/Aug W1

[File 73] **EMBASE** 1974-2005/Aug 16

[File 94] **JICST-EPlus** 1985-2005/Jun W4

[File 35] **Dissertation Abs Online** 1861-2005/Jul

[File 144] **Pascal** 1973-2005/Aug W1

[File 105] **AESIS** 1851-2001/Jul

**File 105: This file is closed (no updates)*

[File 99] **Wilson Appl. Sci & Tech Abs** 1983-2005/Jul

[File 58] **GeoArchive** 1974-2005/May

[File 34] **SciSearch(R) Cited Ref Sci** 1990-2005/Aug W1

[File 434] **SciSearch(R) Cited Ref Sci** 1974-1989/Dec

[File 292] **GEOBASE(TM)** 1980-2005/Jul B1

[File 89] **GeoRef** 1785-2005/Jul B2

**File 89: Please see HELP ALERTALL for new Alert frequency and price. Please see HELP RATES 89 for new Academic Subscriber rates.*

[File 65] **Inside Conferences** 1993-2005/Aug W2

[File 360] **Specialty Chemicals Update Program** 2000/Q2

**File 360: Full fmts cost $85.00 each for TYPEs, DISPLAYs, & PRINTs. Fmt 7 costs $50.00. SCUP subscribers - use F960.Updating suspended.*

[File 239] **Mathsci** 1940-2005/Sep

[File 347] **JAPIO** Nov 1976-2005/Apr(Updated 050801)

[File 305] **Analytical Abstracts** 1980-2005/Aug W1

**File 305: Alert feature enhanced for multiple files, duplicate removal, customized scheduling. See HELP ALERT.*

[File 350] **Derwent WPIX** 1963-2005/UD,UM &UP=200552

**File 350: For more current information, include File 331 in your search. Enter HELP NEWS 331 for details.*

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[File 162] **Global Health** 1983-2005/Jul

[File 164] **Allied & Complementary Medicine** 1984-2005/Aug

[File 357] **Derwent Biotech Res.** _1982-2005/Aug W2

[File 315] **ChemEng & Biotec Abs** 1970-2005/Jul

[File 23] **CSA Technology Research Database** 1963-2005/Jul

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12/3,K/1 (Item 1 from file: 155)
Fulltext available through: USPTO Full Text Retrieval Options
MEDLINE(R)

13680558 **PMID:** 11322075
[High resolution MR-venography of cerebral arteriovenous malformations]

Hochaufgeloste MR-Venographie zerebraler arteriovenoser Malformationen.
Essig M; Reichenbach J R; Schad L; Debus J; Kaiser W A
Forschungsschwerpunkt Radiologische Diagnostik und Therapie, Deutsches Krebsforschungszentrum, Im Neuenheimer Feld 280, 69120 Heidelberg. M.Essig@dkfz-heidelberg.de
Der Radiologe (Germany) Mar 2001 , 41 (3) p288-95 , **ISSN:** 0033-832X **Journal Code:** 0401257
Publishing Model Print
Document type: Journal Article ; English Abstract
Languages: GERMAN
Main Citation Owner: NLM
Record type: MEDLINE; Completed
...was used with a long echo time TE to obtain venous information down to sub-**pixel** sized vessel diameters of several hundred microns. The method is based on the paramagnetic property...
...planning of cerebral AVM, there exist limitations of the technique in regions where strong induced **static field** inhomogeneities are present. CONCLUSIONS: Due to its high sensitivity the method may be of special...
Descriptors: *Image Enhancement; *Imaging, Three-Dimensional; *Intracranial Arteriovenous Malformations--diagnosis--DI; ***Magnetic Resonance** Angiography; *Phlebography ; Adolescent; Adult; Artifacts; Cerebral Veins--pathology--PA; Child; Humans; **Middle** Aged; Predictive **Value** of Tests; Skull Base--blood supply--BS

12/3,K/2 (Item 1 from file: 144)
Pascal

14642227 PASCAL No.: 00-0313438

One year follow up study of primary and transitional progressive multiple
sclerosis

STEVENSON V L; MILLER D H; LEARY S M; ROVARIS M; BARKHOF F;
BROCHET B; DOUSSET V; FILIPPI M; HINTZEN R; MONTALBAN X; POLMAN C H; ROVIRA
A; DE SA J; THOMPSON A J
NMR Research Unit, Institute of Neurology, Queen Square, London WC1 N3BG,
United Kingdom; Neuroimmaging Research Unit, Department of Neuroscience,

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Scientific Institute Ospidale San Raffaele, University of Milan, Italy;
University Hospital, Free University, Amsterdam, Netherlands; Department of
Neurology and Neuroradiology, Hopital Pellegrin, Bordeaux, France; Unitat
de Neuroimmunologia Clinica, Hospital Vall d'Hebron, Barcelona, Spain;
Servico de Neurologia, Hospital de Santa Maria, Lisbon, Portugal
Journal: Journal of neurology, neurosurgery and psychiatry
, 2000, 68 (6
) 713-718
Language: English

Objective-To document clinical and **magnetic resonance imaging** (**MRI**)
characteristics of a large cohort of primary and transitional progressive
multiple sclerosis (PP and TP...

... needed to elucidate the pathological processes responsible for disease
progression and to identify clinical and **MRI** measures which
can monitor these processes in treatment trials. Method-Patients, recruited
from six European centres, underwent two assessments on the expanded
disability status scale (EDSS) and **MRI** of the brain and spinal
cord, 1 year apart. Results-Of the 167 patients studied...

... Both groups demonstrated change in T2 lesion load over the year
(p<=0.002), with **median percentage** changes of
7.3% in the PP group and 10.8% in the TP MS group. The PP group also showed
a significant change in T1 load (p< 0.001, **median** change
12.6%). The number of new cord lesions seen was small (mean of 0...

... TP group). Both groups demonstrated a decrease in cord cross sectional
area (p< 0.001, **median** changes; PP 3.8%, TP 4.9%), but only
the PP group showed evidence of...

English Descriptors: Multiple sclerosis; Progressive; **Primary**;
Nuclear magnetic resonance imaging; **Follow u
p study^Explorat**; Exploration; Human

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14/3,K/1 (Item 1 from file: 73)
Fulltext available through: USPTO Full Text Retrieval Options
EMBASE

11558873 **EMBASE No:** 2002130625
Hemangiomas and vascular malformations: Analysis of diagnostic accuracy

Very M.; Nagy M.; Carr M.; Collins S.; Brodsky L.
Dr. L. Brodsky, Dept. of Pediatric Otolaryngology, Children's Hospital of Buffalo, 219 Bryant Street, Buffalo, NY 14222 United States
Laryngoscope (LARYNGOSCOPE) (United States) 2002 , 112/4 (612-615)
CODEN: LARYA **ISSN:** 0023-852X
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 12

...Results Analysis of diagnostic accuracy revealed a concurrence between initial and final combined clinical and **magnetic resonance imaging**-based diagnosis in only 37% of cases. Analysis of patient and family satisfaction with the... ...37% "not at all" satisfied. On average, 2.5 (SD = 1.6; range, 1-9; **median**, 2) different physicians saw the patient before the patient or family (or both) was satisfied...
MEDICAL DESCRIPTORS:
diagnostic accuracy; patient satisfaction; clinical feature; **nuclear magnetic resonance imaging**; nomenclature; **primary** medical care; medical education; human; male; female; major clinical study; child; article; priority journal

14/3,K/2 (Item 2 from file: 73)
Fulltext available through: USPTO Full Text Retrieval Options
EMBASE

07007234 **EMBASE No:** 1997293710
Somatosensory evoked magnetic fields from primary sensorimotor cortex in juvenile neuronal ceroid lipofuscinosis

Lauronen L.; Heikkila E.; Autti T.; Sainio K.; Huttunen J.; Aronen H.J.; Korvenoja A.; Ilmoniemi R.J.; Santavuori P.
L. Lauronen, BioMag, HUCH, Tukholmankatu 8 F, 00290 Helsinki Finland
Journal of Child Neurology (J. CHILD NEUROL.) (Canada) 1997 , 12/6 (355-360)
CODEN: JOCNE **ISSN:** 0883-0738
Document Type: Journal ; Article
Language: ENGLISH **Summary Language:** ENGLISH
Number Of References: 33
Somatosensory evoked magnetic fields from primary sensorimotor cortex in juvenile neuronal ceroid lipofuscinosis

...system in millimeter and millisecond precision, was used to record somatosensory evoked magnetic fields to median nerve stimulation from 10 patients and their matched control subjects. In both patients and controls, the somatosensory evoked magnetic fields from

primary sensorimotor area typically consisted of N20m, P35m, and P60m deflections. In the patients, N20m was...
MEDICAL DESCRIPTORS:
adolescent; adult; article; child; clinical article; controlled study; female; human; magnetoencephalography; male; nerve cell excitability; nuclear magnetic resonance imaging; priority journal; school child; sensorimotor cortex

14/3,K/3 (Item 1 from file: 34)
Fulltext available through: USPTO Full Text Retrieval Options
SciSearch(R) Cited Ref Sci

06569784 **Genuine Article#:** ZB553 **No. References:** 56
On the reorganization of sensory hand areas after mono-hemispheric lesion: a functional (MEG) anatomical (MRI) integrative study

Author: Rossini PM (REPRINT) ; Tecchio F; Pizzella V; Lupoi D; Cassetta E; Pasqualetti P; Romani GL; Orlacchio A
Corporate Source: OSPED FATEBENEFATELLI,DIV NEUROL, ISOLA TIBERINA 39/I-00186 ROME//ITALY/ (REPRINT); IST SACRO COURE GESU,CTR S GIOVANNI DI DIO, IRCCS, AFAR/BRESCIA//ITALY/; IRCCS S LUCIA,/I-106 ROME//ITALY/; CNR,IST ELETTRON STATO SOLIDO/ROME//ITALY/; UNIV G DANNUNZIO,ITAB/CHIETI//ITALY/; UNIV G DANNUNZIO,IST FIS MED/CHIETI//ITALY/
Journal: BRAIN RESEARCH , 1998 , V 782 , N1-2 (JAN 26) , P 153-166
ISSN: 0006-8993 **Publication date: 19980126**
Publisher: ELSEVIER SCIENCE BV , PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Language: English **Document Type:** ARTICLE (ABSTRACT AVAILABLE)
On the reorganization of sensory hand areas after mono-hemispheric lesion: a functional (MEG) anatomical (MRI) integrative study
Publication date: 19980126
Abstract: ...a clinically stabilized condition. Functional informations from magnetoencephalography (MEG) were integrated with anatomical data from magnetic resonance imaging (MRI). MEG localizations of the neurons firing at early latencies in primary sensory cortex after separate stimulation of median nerve, thumb and little fingers of each hand were carried out. Characteristics of cerebral equivalent... ...as interhemispheric differences of the tested parameters were investigated. Finally, ECDs' locations were integrated with MRI. Lesions involving cortical (C) or subcortical (SC) areas receiving sensory input from the hand were...
Identifiers-- ...EVOKED MAGNETIC-FIELDS; PRIMARY SOMATOSENSORY CORTEX; MEDIAN NERVE-STIMULATION; HUMAN CEREBRAL-CORTEX; MOTOR RECOVERY; ELECTRICAL-STIMULATION; HEALTHY HUMANS; CENTRAL SULCUS; ADULT MONKEYS...

14/3,K/4 (Item 2 from file: 34)
Fulltext available through: USPTO Full Text Retrieval Options
SciSearch(R) Cited Ref Sci

10696947

06158703 **Genuine Article#:** XY713 **No. References:** 30

Spatial properties and interhemispheric differences of the sensory hand cortical representation: a neuromagnetic study

Author: Tecchio F; Rossini PM (REPRINT) ; Pizzella V; Cassetta E; Romani GL
Corporate Source: OSPED FATEBENEFRATELLI OFTALMICO,DIV NEUROL, ISOLA TIBERINA 39/I-00186 ROME//ITALY/ (REPRINT); OSPED FATEBENEFRATELLI OFTALMICO,DIV NEUROL/I-00186 ROME//ITALY/; IRCCS S LUCIA,/ROME//ITALY/; IST S CUORE,IRCCS S GIOVANNI DI DIO FBF, AFAR/BRESCIA//ITALY/; UNIV G DANNUNZIO,IST FIS MED, IST TECNOL BIOMED AVANZATE/CHIETI//ITALY/

Journal: BRAIN RESEARCH , 1997 , V 767 , N1 (AUG 29) , P 100-108
ISSN: 0006-8993 **Publication date:** 19970829
Publisher: ELSEVIER SCIENCE BV , PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
Language: English **Document Type:** ARTICLE (ABSTRACT AVAILABLE)
Publication date: 19970829

Abstract: ...with the shortest latencies (N20 m and P30 m components) by separate stimulation of contralateral **median** nerve, thumb and little finger were analysed. The ECD spatial coordinates were in agreement with... ...of the sensory homunculus: little finger more medial and posterior, thumb more lateral and anterior, **median** nerve in-between. By considering the ECDs to thumb and little finger stimulation the boundaries ... ...5 mm. We provide for the first time the ECDs localization of left and right **median** nerve, thumb and little finger, as well as the 'hand extension' values, and their interhemispheric...

Identifiers-- ...**PRIMARY** SOMATOSENSORY CORTEX; CEREBRAL **MAGNETIC** RESPONSES; **MEDIAN** NERVE-STIMULATION; FUNCTIONAL-ORGANIZATION; ELECTRICAL-STIMULATION; CENTRAL SULCUS; REORGANIZATION; MONKEYS; HUMANS; FIELDS
Research Fronts: 95-1772 001 (FUNCTIONAL **MAGNETIC-RESONANCE- IMAGING**; SEQUENTIAL DYNAMIC SUSCEPTIBILITY CONTRAST MR EXPERIMENTS IN HUMAN BRAIN; TOPOGRAPHY OF THE CORTICAL MOTOR HAND...

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